

CLAIMS

1. Method for detecting defects, the method comprising the procedures of:
 - identifying theoretically-symmetrical windows in an object-image;
 - analyzing said theoretically-symmetrical windows according to expected symmetry of said theoretically-symmetrical windows; and
 - determining the presence of defects according to a deviation from said expected symmetry.
2. The method according to claim 1, further comprising a preliminary procedure of scanning a physical object, thereby producing said object-image.
3. The method according to claim 1, further comprising a preliminary procedure of analyzing a database-image thereby identifying symmetrical database-image windows therein, wherein said theoretically-symmetrical windows are identified according to said symmetrical database-image windows.
4. The method according to claim 2, further comprising a preliminary procedure of analyzing a database-image thereby identifying symmetrical database-image windows therein, wherein said theoretically-symmetrical windows are identified according to said symmetrical database-image windows.
5. The method according to claim 3, wherein said procedure of analyzing said database-image comprises the procedures of:
 - identifying at least one database-image element; and
 - determining a symmetrical database-image window for each of said at least one database-image element.
6. The method according to claim 5, wherein said procedure of analyzing a database-image further comprises a procedure of determining symmetry properties of said database-image element.
7. The method according to claim 5, wherein said procedure of analyzing a database-image further comprises a procedure of determining dimensions of said database-image element.
8. The method according to claim 6, wherein said procedure of analyzing said database-image further comprises a procedure of determining dimensions of said database-image element.

9. The method according to claim 1, wherein said procedure of analyzing theoretically-symmetrical windows comprises procedures of:

5 identifying theoretically symmetrically-similar windows and a manipulation associated therewith, from said theoretically-symmetrical window;

manipulating at least one of said theoretically symmetrically-similar windows thereby producing a plurality of theoretically-identical windows; and

10 comparing said theoretically-identical windows there between, thereby producing a comparison result.

10. The method according to claim 3, wherein said procedure of identifying theoretically-symmetrical windows in an object-image, comprises procedures of:

15 registering a symmetrical database-image window in said object-image, thereby identifying an initial symmetry-testing window; and

20 identifying said symmetry-testing window as a theoretically-symmetrical window.

11. The method according to claim 10, further comprising a procedure of refining said symmetry-testing window.

25 12. The method according to claim 11, wherein said procedure of refining said symmetry-testing window is performed according to a symmetry-based optimization.

30 13. The method according to claim 12, further comprising a procedure of refining said symmetry-testing window by interpolating results calculated in said symmetry-based optimization.

35 14. The method according to claim 10, wherein said procedure of registering a symmetrical database-image window in said object-image, comprises procedures of:

identifying an object-image window;

producing an alignment-assessment value for said object-image window according to an alignment-assessment function; and

identifying an optimal object-image window;

40 wherein a sequence of said procedure of identifying an object-image window and said procedure of producing an alignment-assessment value, is repeated for a plurality of iterations, each of said plurality of iterations involving a different object-image window.

- 5 15. The method according to claim 14, wherein said procedure of registering a symmetrical database-image window in said object-image, further comprises a preliminary procedure of defining said alignment-assessment function.
- 10 16. The method according to claim 12, wherein said procedure of refining said symmetry-testing window, comprises procedures of:
producing a symmetry-assessment value for said symmetry-testing window according to a symmetry-assessment function; and
identifying an optimal symmetry-testing window.
- 15 17. The method according to claim 16, further comprising the procedure identifying another symmetry-testing window in said object-image, after said procedure of producing a symmetry-assessment value,
wherein a sequence of said procedure of identifying another symmetry-testing window and said procedure of producing a symmetry-assessment value, is repeated for at least one iteration, each of said at least one iteration involving a different symmetry-testing window.
- 20 18. The method according to claim 16, wherein said procedure of refining said symmetry-testing window, further comprises a preliminary procedure of defining said symmetry-assessment function.
- 25 19. The method according to claim 2, wherein said physical object is a photographic mask.
- 30 20. The method according to claim 2, wherein said physical object is a reticle.
- 35 21. The method according to claim 2, wherein said physical object is a printed material.
22. The method according to claim 2, wherein said physical object is a fabricated material.
- 40 23. The method according to claim 1, wherein said procedures are performed in real-time.
24. The method according to claim 1, wherein said expected symmetry is axial.

25. The method according to claim 1, wherein said expected symmetry is rotational.

5 26. The method according to claim 1, wherein said expected symmetry is axial-rotational.

27. System for detecting defects in an object-image, the system comprising:

10 a storage unit, at least storing at least a portion of said object-image; and

a processor coupled with said storage unit, a database and a human interface,

15 wherein said processor identifies theoretically-symmetrical windows in said at least a portion of said object-image, according to an analysis of at least a portion of a database-image retrieved from said database; and

20 wherein said processor detects defects in said theoretically-symmetrical windows according to a deviation from expected symmetry properties of said theoretically-symmetrical windows.

28. The system according to claim 27, further comprising a scanner, producing said object-image.

25 29. The system according to claim 27, wherein said processor further identifies at least one database-image element in said database-image; and

30 wherein said processor further determines a symmetrical database-image window respective of said at least one database-image element, when said database-image is symmetrical.

30. The system according to claim 29, wherein said processor further determines dimensions and symmetry properties of said database-image element.

35 31. The system of according to claim 30, wherein said processor registers a symmetrical database-image window in said object-image, thereby identifying a symmetry-testing window; and

40 wherein said processor identifies said symmetry-testing window as a theoretically-symmetrical window.

32. The system according to claim 31, wherein said processor further refines said symmetry-testing window.

33. The system according to claim 32, wherein said processor performs said refining of said symmetry-testing window according to a symmetry-based optimization.

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34. The system according to claim 33, wherein said processor further refines said symmetry-testing window by interpolating results calculated in said symmetry-based optimization.

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35. The system according to claim 33, wherein said processor further refines said symmetry-testing window by interpolating results calculated in said symmetry-based optimization.

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36. The system according to claim 27, wherein said storage unit further stores said database.